RESOURCE EXTRACTION

LONG-TERM GOAL (15 YEARS)

To improve surface and ground water quality in watersheds throughout the Commonwealth of Virginia by reducing nonpoint source pollution associated with abandoned and orphaned resource extraction sites in 20 - 25 sub-watersheds for the purpose of obtaining designated uses. This can be accomplished through proper site planning, implementation of best management practices, acid mine drainage remediation and land reclamation activities in associated high priority watersheds or areas with identified impaired stream segments.

INTRODUCTION

The Virginia General Assembly determined that uncontrolled resource extraction activities in Virginia, from the mining of coal and non-fuel minerals and the extraction of gas and oil, can contribute several pollutants to water resources. Legislation was passed to regulate these activities. Discussion of these laws will follow. Resource extraction activities are broken into three subcategories; coal mining, gas and oil, and mineral mining. The pollutants associated with each are as follows:

- Coal Mining: ground water impacts, heavy metal contamination, manganese, iron, sulfate, total suspended solids (TSS), acid mine drainage, erosion and sediment, and impacts on biota;
- Gas and Oil: ground water impacts, TSS, erosion from land disturbance, and impacts from access roads; and
- Mineral Mining: ground water impacts, total suspended solids (TSS), acid mine drainage, erosion and sediment, impacts on biota, heavy metal contamination, and pH levels (ambient as well as site discharge).

Additionally, material exposed by mining may also react with air contributing to acid mine drainage.

On all active mining sites, all water discharges (including surface and ground water discharges) must flow through a National Pollutant Discharge Elimination System

(NPDES) permitted discharge point, and is by definition a point source, and therefore, not a factor in the Nonpoint Source (NPS) Pollution Management Program. No point source discharges are allowed from gas or oil well sites in Virginia. Operators of active mines and well sites are required by state law to implement management practices that control the release of sediment from the site and meet current state and federal effluent standards for point source discharges. These active sites also must be reclaimed to a stable condition once the resource extraction activity is complete. However, many resource extraction sites ceased operation before laws requiring reclamation existed, and fall into the realm of NPS pollution.

Water quality issues are addressed through a permit process requiring that a performance bond be furnished by the permittee to insure that final reclamation of the mine or well site is completed. The permit process for all resource extraction sites requires the operators to submit an Operation and Reclamation Plan as an integral part of the permit application. The Operation and Reclamation Plan consists of four major elements:

- a description of the method of operation;
- a description of the drainage system with appropriate design data;
- a reclamation schedule including a description of intended use; and
- maps illustrating the total area to be permitted.

The Operation and Reclamation Plan must be designed to minimize the adverse effects on the environment and to facilitate integration of reclamation with the mining operation. All sites with active ground disturbances are inspected for reclamation at least twice annually to ensure compliance with state laws and regulations.

The focus of this chapter is the NPS pollution associated with resource extraction activities that arises from abandoned coal operations, orphaned mineral mines, and gas or oil well sites. These sites were not subject to current regulatory requirements and operated without having to meet the NPDES effluent standards. Abandoned and orphaned sites can remain unvegetated for 100 years after extraction activities have ceased and represent the primary source of NPS pollution from mineral, gas and coal extraction.

The definition of abandoned mines refers to coal mines abandoned prior to the Surface Mining Control and Reclamation Act (SMCRA) of 1977. Orphaned mineral mines are defined as those areas disturbed by the mining of minerals, not including coal, which were not required by law to be reclaimed or have not been reclaimed. Orphaned wells are those gas or oil wells that were abandoned prior to the enactment of current laws requiring reclamation.

The potential for NPS pollution impacts of abandoned and orphaned mines on state waters is significant. Erosion and sedimentation can destroy aquatic habitat and ruin stream channels. Acid mine drainage (low ph), and the corresponding heavy metal contamination, can significantly impair the ability of a stream to support biota, killing plants and animals that cannot withstand low pH levels. Ground water contamination from abandoned and orphaned mines and wells is also a concern due to fracturing and open pathways for pollutants to enter an underground aquifer. These impacts are remediated through reclamation activities on nonpermitted sites.

ISSUE IDENTIFICATION & PROGRAM ASSESSMENT

This section describes the regulatory process, reclamation, research education and technical assistance, and funding needs regarding NPS issues and the programs in place to address the issues.

The Department of Mines, Minerals, and Energy (is the primary state agency that regulates the resource extraction industry in Virginia. The DMME's Divisions of Mined Land Reclamation, Gas and Oil, and Mineral Mining deal directly with NPS pollution by conducting reclamation activities.

There are five categories of prioritization that define the degree of hazard to human health and safety, and impacts to the environment from abandoned coal mine lands (AML). The most serious AML problems are those posing a threat to health, safety and general welfare of the people and are considered to be "high priority." These are categorized as Priority 1 and 2. States are required by federal law to reclaim these two types before moving to lower priorities. Problems associated

with Priority 1 and 2 sites include clogged streams, dangerous impoundments, hazardous recreational water body, and polluted water for agricultural, industrial or human consumption. The Priority 3 designation focuses on problems known to be associated with the environment and includes waste dumps, equipment and facilities, haul roads, slurry, and runoff.

Priority 4 problems include the adverse effects of coal mining practices on the protection, repair, replacement, construction, or enhancement of public facilities such as utilities, roads, recreation, and conservation facilities. Priority 5 involves the development of publicly owned land adversely affected by coal mining practices, including land acquired as provided in SMCRA for recreation and historic purposes, conservation, reclamation and open space benefits.

SOURCE CATEGORIES

INACTIVE SITES SOURCE CATEGORY	POLLUTANT CATEGORY		
	TOTAL SUSPENDED SOLIDS	HEAVY METALS	LOW pH LEVELS
Gas and Oil	**T**		
Mineral Mining	**T**	**T**	**T**
Coal Mining	**T**	**T**	**T**

Regulatory Process

DMME Division of Mined Land Reclamation

DMME's Division of Mined Land Reclamation (DMLR) administers the state law and regulations pertaining to coal surface mining reclamation and related water quality issues in the Commonwealth of Virginia. The primary law regulating these activities is Virginia's Coal Surface Mining Control and Reclamation Act, Chapter 19 of Title 45.1 of the *Code of Virginia*, and attendant regulations. At present, there are approximately 60,000 acres under permit on 657 coal mines in southwest Virginia. The main issues with coal mining are total suspended solids (TSS), heavy metal contamination (manganese, iron, sulfate) and impacts on biota from low pH levels due to acid mine drainage.

Each permit includes standards for ground water protection, water quality, public notification, and soil and erosion control. DMLR conducts regular inspections to determine compliance during site construction, production, reclamation and final abandonment. Production records are submitted and maintained at the DMLR office.

DMME Division of Gas and Oil

The authority to manage the gas and oil industry is found in Virginia's Gas and Oil Act, Chapter 22.1 of Title 45.1 of the *Code of Virginia*, and attendant regulations. This legislation requires that each gas and oil operation meet standards for environmental protection, public safety, and resource conservation. The DGO regulates permitting, development, operation and reclamation of gas wells, oil wells, gathering pipelines, compressor stations, and associated facilities. The main NPS pollution issues for gas and oil well are groundwater impacts and TSS from land disturbance erosion, and impacts from access roads.

Each operating permit includes standards for

groundwater protection, water quality, public notification, and soil and erosion control. DGO conducts regular inspections to determine compliance during site construction, drilling, production, reclamation and final abandonment. Production records are also submitted and maintained at the DGO office.

At the end of 1998 Virginia had 1,036 conventional wells, 1,342 coal bed methane wells and 10 wells permitted for both conventional and coal bed methane production in southwest Virginia.

DMME Division of Mineral Mining

DMME's Division of Mineral Mining (DMM) provides for the safe and environmentally sound production of Virginia's non-fuel minerals. The primary law regulating these activities is the Mineral Mining Law, Chapter 16 of Title 45.1 of the *Code of Virginia*, and attendant regulations. Statewide, there are 493 non-fuel mines covering approximately 68,000 acres that are permitted and inspected by the DMM. These include quarries, sand and gravel pits, and other surface and underground mining operations. The main NPS pollution issues for mineral mining are TSS, heavy metal contamination and low pH levels from acid mine drainage. Mineral mining operations are not clustered in any one area but located throughout Virginia.

A large portion of the minerals mined in Virginia are extracted for the construction of roads and commercial and residential buildings. Additionally, other minerals are used for agriculture, high temperature ceramics and glass making.

Department of Environmental Quality

Virginia's Department of Environmental Quality (DEQ) regulations require all owners and operators of nonmetallic mining operations to apply for coverage under a Virginia Pollution Discharge Elimination System (VPDES) General Permit Regulation for Nonmetallic Mining (VR 680-14-21). The general permit covers processed water and mine pit dewatering associated with activities classified as nonmetallic mining industry.

The effluent limitations and monitoring requirements set forth in the general permit include monthly measurements of the average and maximum point source flow and testing the effluent for total suspended solids (TSS) and pH from a grab sample once every three months. The DEQ director may require every permittee to conduct additional water quality monitoring to determine the effect of the pollutant(s) on the water quality, to prevent pollution of state waters and to satisfy the requirements of the Virginia State Water Control Law, the Clean Water Act and other DEQ regulations.

Chesapeake Bay Local Assistance Department

The Chesapeake Bay Local Assistance Department (CBLAD) provides assistance to 84 Tidewater local governments in developing, adopting and implementing local programs to protect water quality through the Virginia Chesapeake Bay Preservation Act (the Act - §10.1 - 2100 et seq., *Code of Virginia*) and the Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC 10-20-10 et seq., *Virginia Administrative Code*). The local Bay Act regulations supplement existing land use ordinance requirements and include the requirement for designation of Resource Protection Areas along tidal shorelines, tributary streams, and tidal and nontidal wetlands. Land use in the RPAs is limited to water dependent facilities and redevelopment activities. Any other activities, such as mining operations, are not permitted by right in the RPA and such land uses should be considered by the local government on a case-by-case basis.

Virginia Marine Resources Commission

Submerged Lands Management Program
(Sec. 28-2-1200 through 28.2-1213 of the *Code of Virginia)*

The Virginia Marine Resources Commission (VMRC) administers the Submerged Lands Permitting Program throughout the state. In non-tidal areas this program includes waterways with flows greater than five cubic feet per second (CFS) or drainage areas greater than five square miles.

Permits are issued through a joint permit review process involving local, state and federal agencies. Permits are reviewed based on compliance with statutory requirements and *Subaqueous Guidelines* as well as technical assistance provided by cooperating state and

federal agencies. Technical assistance comments are received from DEQ, DCR, Department of Health (VDH), and DGIF. Impacts on water quality, water quantity, habitat and aquatic resources, as well as affects on adjacent properties, are considered during permit review. BMPs are included in permits when applicable, as are requirements for minimum flows and provisions for continued fish passage. When applicable, permits can also require compliance with erosion and sediment control practices described in the *1992 Virginia Erosion and Sediment Control Handbook.*

Local Governments

Local governments are responsible for developing and implementing comprehensive plans and local growth strategies. As such, the local jurisdictions are responsible for ensuring that mining operations are compatible with current and future land use. Local governments have a variety of options through local ordinances and codes to address compatible land use, water quality issues and erosion and sediment control. The Richmond Regional Planning District Commission (RRPDC) presented an analysis of local government management considerations for borrow pit operations for the Richmond area in the report *Sand and Gravel Resources: Local Options for Protection and Regulation* (November, 1989). The report presents five options available to localities to regulate sand and gravel operations through zoning:

- prohibit sand and gravel mining in all or parts of the jurisdiction;
- include sand and gravel mining as a permitted use in one or more existing zoning districts;
- establish a surface mining district;
- create a mining overlay district; and
- allow mining in one or more existing zoning districts by the use of special zoning such as a special exception or conditional use permit.

Special conditions are typically placed on the mining operation based on issues and concerns raised about each particular site.

The Hampton Roads Planning District Commission (HRPDC) has presented a similar analysis in the report *Borrow Pit Management Strategy Study* (January, 1996).

Ad-Hoc Remining Task Force

Reclamation of abandoned coal mines could be greatly accelerated through remining. Currently, DMLR is working with EPA through the Interstate Mining Compact Commission (IMCC) Remining Task Force to develop best management practices (BMPs) on remining coal mine sites that have existing acid mine drainage (AMD). The goal of the Remining Task Force is to have the effluent limitations on these sites reduced or eliminated if BMPs are implemented. At this time, Virginia is supplying data to EPA that shows BMPs are successful in the reduction of AMD discharge if they are properly installed. The goal of the project is to encourage operators to remine areas that they would not otherwise mine because of an AMD problem. The implementation of a BMP, or suite of BMPs would replace the effluent numeric limits. EPA has agreed that the NPDES regulating authority in each state may implement an experimental program to use BMPs for gathering data for a regulation change that EPA is considering.

Reclamation

DMME Division of Mined Land Reclamation

The Division of Mined Land Reclamation (DMLR) administers the state law and regulations pertaining to coal surface mining and reclamation and related water quality issues in the Commonwealth of Virginia. DMLR's Abandoned Mine Land Section (AML) reclaims mines abandoned prior to the Federal Surface Mining Control and Reclamation Act of 1977. Funds for reclamation projects come from a per-ton tax paid by coal mine operators. The AML program has reclaimed hundreds of abandoned sites at a cost of approximately $57 million since the program started in 1981. These sites have featured problems such as dangerous highwalls, landslide-prone areas, abandoned mine openings, burning refuse, hazardous structures, and mine subsidence.

The Abandoned Mined Land (AML) Program in Virginia prioritizes abandoned coal mine sites for reclamation. There are five priority classifications with Priority 1

being the highest. First consideration is given to Priority 1 or 2 sites where public health and safety and the general welfare are endangered from the abandoned sites. States are required by law to reclaim all sites classified as Priority 1 or 2 before reclaiming Priority 3, 4, and 5 sites. Virginia's AML Inventory has identified 400 high priority problem areas. A problem area may have several features. Using inventory data on the total estimate to reclaim Priority 1, 2, and 3 problem areas and the amount already expended, it would take DMLR 128 years to reclaim all of the problems areas. This figure is skewed, however, by the amount of money required to reclaim Priority 3 (environmental hazard) areas, some of which could be reclaimed through remining. Omitting Priority 3 sites, it will take 50 years to complete the reclamation of Priority 1 and 2 problems at the current level of funding.

DMME Division of Mineral Mining

The enactment of non-fuel mine safety and reclamation laws recognized that, while providing needed resources for development, uncontrolled mining could result in safety and environmental hazards. Virginia's Orphaned Land Program was enacted in 1978 to alleviate the environmental and public health and safety hazards associated with abandoned mineral mine sites.

The Orphaned Land Advisory Committee is composed of individuals from DMM, mineral mining industry, Virginia Polytechnic Institute and State University (VPI&SU), the Virginia Department of Transportation, DEQ, the USDA Natural Resources Conservation Service, private citizens, and the Virginia Aggregates Association. This Committee assists DMM in evaluating sites and prioritizing reclamation activity.

There are approximately 3,000 orphaned mineral mines throughout Virginia. To date, 73 reclamation projects have been completed encompassing 560 acres of eroded and unstable lands at a cost of $2.25 million. In 1996 a new protocol was developed to inventory orphaned mineral mines identified as DCR NPS pollution high priority watershed designations. The intent is to integrate orphaned mineral mines data into the NPS pollution prioritization system along with agriculture, urban development and forestry data. Approximately three to six sites are reclaimed annually.

DMME Division of Gas and Oil

The Virginia Gas and Oil Act established Virginia's orphaned well program. The program requires a $50 payment for every permit application submitted. These fees are placed into a fund, which is used to plug and reclaim the orphaned well sites. Currently, Virginia has identified approximately 70 orphaned wells. 1999 is the first year the DGO has been able to plug orphaned wells. To date, three have been completed at a cost of $51,000. Wells are plugged to prevent oil or gas from migrating into water zones, mines, caverns, and to prevent interaction with drinking water supplies.

Research, Education and Technical Assistance

Virginia Cooperative Extension

Virginia Cooperative Extension (VCE) is involved in resource extraction pollution remediation through its Powell River Project. This is an applied research project and education effort of VCE to benefit the people, industries and governments of the Virginia coal region. The Powell River Project team sponsors and conducts research that develops cost-effective environmental protection practices for use by the coal industry. This is accomplished through cooperation with DMLR, the federal Office of Surface Mining (OSM) and the Virginia coal industry. Funding is provided by the state, through VPI&SU and VCE, and the coal industry. Topics addressed include revegetation of mine areas, and treatment and renovation of mine water discharges. VCE conducts educational programming to inform the coal industry, local governments and citizens in Virginia's coal-mining area about improved land reclamation and water quality protection technologies that have been developed through research. The programming also provides guidance in the application of research-based technologies. This information is made available to non-coal mining industries in other parts of the state.

Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS),

formerly the Soil Conservation Service, has not received federal funding for the Rural Abandoned Mine Program (RAMP) program for the last three years. NRCS is presently completing the remaining sites in its inventory and should have the last site finished in 1999. A partnership agreement for the reclamation of the Guest River Watershed in Wise County, Virginia, is currently pending between NRCS and DMME's AML program. Although NRCS may not have the RAMP funds restored in future budgets, it supports all reclamation efforts in Virginia. NRCS will continue to provide soil survey and BMP information for all pending sites as well as those under construction. NRCS will continue to provide personnel and expertise to help the soil and water conservation districts (SWCDs), OSM and DMME to prioritize potential sites. NRCS will continue to review and make technical and BMP recommendations to all other agencies addressing AML sites.

Virginia Institute of Marine Science

The Virginia Institute of Marine Science (VIMS), primarily through the Coastal Watershed Center (CWC) and under the authority of sections 28.2-1100,1205 and 1301 of the *Code of Virginia*, provides technical assistance to the commonwealth regarding activities that may impact the natural resources within the coastal waters of the state. This may include sand and gravel pits as well as other surface mining operations. The CWC conducts educational programming to inform local governments, state agencies and citizens about water quality issues and provides a technical report series on various topics regarding the waters of the commonwealth.

U.S. Army Corp of Engineers

DMME, through the DMLR's AML Section and the state sponsor, the Lenowisco Planning District Commission, is providing AML matching money for the Powell River Watershed Ecosystem Restoration Project in conjunction with the U.S Army Corps of Engineers (USACOE). The study will look primarily at AMD impacts to the Powell River ecosystem related to coal mining. Reconnaissance and feasibility studies in the Ely, Pucket and Straight creek tributaries of the Powell River watershed will be completed this summer. AML matching funds committed to date total $400,000 on a 50/50 match. Design and construction phases of the project will start this fall with a construction start projected for 2000-2001.

The Powell River Watershed Ecosystem Restoration Project is a multiphase, multiyear project with a total projected cost of $7 million over the next five to seven years. A streamline feasibility study for other watersheds of the North Fork of the Powell River Basin (Reeds, Jones, Bundy and Cox creeks) has just started.

The USACOE is also preparing reconnaissance studies for the Upper (headwater) Powell River watershed and the Clinch River watershed. The DMME will work closely with the USACOE on this project as well. Local sponsors and funding sources have not been secured at this time.

Department of Game and Inland Fisheries

Under an agreement with the DMLR, DGIF provides technical assistance to the Abandoned Mine Land Section for reclamation activities. The purpose is to determine potential adverse impacts upon fish and wildlife resources and habitats, and to recommend appropriate measures to avoid, reduce or compensate for those impacts. Emphasis is often placed on habitat restoration and improvement techniques, which enhance the quality of wildlife habitat. Two Memoranda of Agreement (MOA) were established in 1984 to implement this coordination with DMLR for general surface mining and abandoned mine land reclamation projects.

Funding Needs

DMME operates inventory and construction programs designed to identify and eliminate public safety hazards and pollution from abandoned coal and mineral mines and gas and oil wells. While effective, the scope of these programs is severely limited by the funds that are available for NPS pollution abatement.

DMME Division of Mined Land Reclamation

The DMLR's Abandoned Mined Land Section receives the majority of its funds from grants awarded to Virginia

by the U.S. Department of Interior (DOI). These funds are derived from a reclamation tax levied upon the coal mining industry. The fees are collected for the purpose of reclaiming land mined for coal prior to August 3, 1977 and which was inadequately reclaimed by today's standards. Currently, all of the fees collected by the DOI are not being returned to the states in order to reclaim abandoned lands. This greatly diminishes the amount of reclamation that can occur on abandoned lands.

Virginia's ability to address AML problems is influenced by the number and variety of problems identified in the AML inventory, the required prioritization of projects, funding allocations, and the 2004 current end-date of the AML Program. Work is far from complete at Priority 1 and 2 sites, correcting hazards such as clogged streams, highwalls, water filled pits, dangerous impoundments, refuse areas and mine subsidence. Acid mine drainages still pollute miles of streams. Additionally, funds are expended for public water supply projects in areas where the water has been degraded by past coal mining and for emergency reclamation projects.

States are allowed to spend up to 30 percent of their funds on public water supply projects, set aside 10 percent of their funds for the treatment of acid mine drainage, and use funding as necessary to abate emergency situations. Additional AML funds are set aside for the Appalachian Clean Streams Initiative, the Small Operators Assistance Program (SOAP), federal reclamation programs where states do not have an approved AML program, and federal, state and tribal administration of the program.

Through September 30, 1998, about $155 million in reclamation fees has been collected in Virginia. Only about $57 million has been distributed back to the state.

Virginia has more than $110 million remaining in high Priority 1 and 2 reclamation needs as estimated by DMME. The commonwealth also has $120 million in water projects eligible for AML funding, and $300 million in medium Priority 3 reclamation project needs. This totals $530 million for the higher priority projects in Virginia. Costs for lower Priority 4 and 5 needs have not been estimated. Virginia receives approximately $4.5 to $5 million each year for the program. At the current rate of available funding, it will take Virginia 50 years to reclaim its most critical sites abandoned prior to 1977. When eligible water projects and sites mined between 1977 and 1981 are added, it will take over 100 years.

Currently, additional funding is being received for specific projects from EPA through section 104(b)(3) and 319 grants.

DMME Division of Gas and Oil and Division of Mineral Mining

The DMM uses interest earned from a state managed industry self-bonding program for reclamation of orphaned mine sites which were not required by law to be reclaimed or have not been reclaimed. The DGO uses monies appropriated by the General Assembly, interest earned from those monies, and a well permit surcharge to fund the reclamation of orphaned well sites.

While the presence of these orphaned mineral mine and gas well funds is beneficial, they only allow for a limited number of sites to be reclaimed each year. With more than 3,000 abandoned mineral mine and gas and oil well sites in Virginia, DMME seeks to continue to expand the usefulness of its funds by leveraging them with grants for future projects. Approximately $153 million would be required to reclaim the estimated 3,000 abandoned mineral mines.

Currently, additional funding is being received for specific projects from EPA through section 104(b)(3) and 319 grants.

Virginia Cooperative Extension

The VCE Powell River Project funding comes from a variety of sources, including state funds allocated to VPI&SU, and contributions by the coal industry and other southwest Virginia natural resource firms. Continuation of the Powell River Project's current programming is dependant upon funding provided by both the state and the coal industry. If Virginia's coal production continues to decline, industry support for these programs at current levels may be jeopardized. The Powell River Project is seeking to continue and expand research and education programming by seeking funds from a wider range of sources.

OBJECTIVES (SHORT-TERM GOALS)

Four objectives (short-term goals) were identified by the work group regarding resource extraction activities. These goals target the abandoned and orphaned sites. This approach will address the issues identified by the work group: TSS, acid mine drainage, heavy metal contamination, impacts to biota, and surface and ground water quality. The abandoned coal mine sites that qualify for remining activity will be permitted and the associated potential water quality impacts will be addressed through the NPDES point source permit process. The objectives are:

Objective 1. Determine the magnitude and quantity of nonpoint source pollution impacts to the environment from abandoned coal mines, orphaned mineral mine sites, and orphaned gas and oil wells so that reclamation activities can be prioritized

Objective 2. Continue and enhance, where possible, the reclamation of abandoned coal mines, orphaned mineral mines, and orphaned gas and oil sites with the greatest potential for reducing nonpoint source pollution to surface and ground water from TSS, heavy metals, and acid mine drainage (low pH), that impact the health and safety of residents and living resources of Virginia

Objective 3. Support and develop research and education activities to improve the knowledge and understanding of Virginia residents regarding resource extraction activities and the environment

Objective 4. Identify opportunities for developing partnerships with state and federal agencies and other interested organizations to address nonpoint source pollution from abandoned mines

TABLES OF OBJECTIVES & STRATEGIES

The milestones presented in this section reflect the fact that limited resources are available to quickly and completely address the extent of NPS pollution associated with abandoned and orphaned mine lands. Several activities conducted annually will continue based on the presumption that current levels of funding will be maintained.

Additional activities, such as complete incorporation of the DMME mine land information into the DCR NPS Pollution Watershed Assessment process and the DEQ 305(b) and 303 (d) list reports, are new and will require innovative approaches to funding and for addressing the issues. Of increasing importance is the availability of Abandoned Mine Land funds and the use of remining activities for reclamation. More effective use of these two elements could increase the number of sites annually reclaimed resulting in greater annual water quality improvements.

OBJECTIVE 1				
Determine the magnitude and quantity of nonpoint source pollution impacts to the environment from abandoned coal mines, orphaned mineral mine sites, and orphaned gas and oil wells so that reclamation activities can be prioritized				
STRATEGIES	**RELATED TASKS**	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
1.1 Incorporate mining data into NPS pollution water quality databases		•DMME •DCR •DEQ	2003 - update annually thereafter	•General Fund
	Develop data format and protocol for agency information exchange	•DMME •DCR •DEQ	2000	•General Fund •US Dept. of the Interior
	Initiate data incorporation into NPS pollution watershed prioritization process	•DCR •DMME •DEQ	2001	•General Fund
	Initiate incorporation of abandoned site data information into 303(d) list of impaired streams	•DMME •DCR •DEQ	2001	•319 grant •General Fund •US Dept. of the Interior
	Develop targeted monitoring plan to support and strengthen reclamation efforts	•DEQ •DMME •Citizens groups	2003	•Unknown
1.2 Continue programs to inventory and prioritize abandoned mine sites		•DMME	Ongoing	•319 Grant •General Fund •US Dept. of the Interior
1.3 Review and evaluate progress		•NPSAC agencies	Annually	•N/A

OBJECTIVE 2				
Continue and enhance, where possible, the reclamation of abandoned coal mines, orphaned mineral mines, and orphaned gas and oil sites so that available resources are targeted to those sites with the greatest potential for reducing nonpoint source pollution to surface and ground water from TSS, heavy metals, and acid mine drainage (low pH), that impact the health and safety of residents and living resources of Virginia				
STRATEGIES	**RELATED TASKS**	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
2.1 Utilize the NPS watershed prioritization process developed in 1996		•DMME •DCR •DEQ	Ongoing	•General Fund
	Systematically inventory and conduct site investigations on all orphaned mineral mine sites in the state and continue to refine the protocol as appropriate	•DMME	2015 and beyond	•319 grant •RAMP and AML funds (if available) •General Fund
2.2 Ensure that habitat protection is an integral part of plans developed for the reclamation of abandoned and orphaned mine sites		•DMME •DCR •PDCs •CBLAD •Localities	Ongoing	•319 grant •RAMP and AML funds (if available) •General Fund
	Continue to include habitat restoration in reclamation activities	•DMME •DGIF	Ongoing	•319 grant •RAMP (if available) AML funds (if available) •General Fund
	Initiate work with localities to ensure inclusion or re-creation of resource protection area buffer in reclamation plans	•CBLAD •DCR •DMME •PDCs	2001	•Unknown

OBJECTIVE 2 (Cont.)

Continue and enhance, where possible, the reclamation of abandoned coal mines, orphaned mineral mines, and orphaned gas and oil sites so that available resources are targeted to those sites with the greatest potential for reducing nonpoint source pollution to surface and ground water from TSS, heavy metals, and acid mine drainage (low pH), that impact the health and safety of the residents and living resources of Virginia				
STRATEGIES	**RELATED TASKS**	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
2.2 (Cont.) habitat protection	Continue to work with natural resource agencies	•DMME	Ongoing	•319 grant •RAMP and AML funds (if available)
2.3 DMLR will remediate acid mine drainage sites in the Ely Creek watershed	Complete implementation of reclamation plan	•DMME	2001	•General Fund •US Dept. of the Interior •319 Grant
2.4 Continue to solicit funding for, and reclaim, 20 - 25 abandoned and orphaned mine sites per year		•DMME	25 sites annually (if current levels of funding are main-tained)	•319 grant •US Dept. of the Interior •RAMP and AML funds (if available)
	Reclaim 15 - 18 coal sites	•DMME	Annually (at current funding levels)	•US Dept. of the Interior •RAMP and AML funds (if available)
	Plug 15 orphaned and forfeited wells	•DMME	2005	•Permit fees
	Plug 15 orphaned and forfeited wells	•DMME	2010	•Permit fees
	Plug 15 orphaned and forfeited wells	•DMME	2015	•Permit fees

OBJECTIVE 2 (Cont.)

Continue and enhance, where possible, the reclamation of abandoned coal mines, orphaned mineral mines, and orphaned gas and oil sites so that available resources are targeted to those sites with the greatest potential for reducing nonpoint source pollution to surface and ground water from TSS, heavy metals, and acid mine drainage (low pH), that impact the health and safety of the residents and living resources of Virginia

STRATEGIES	RELATED TASKS	AGENCIES & OTHERS	TARGET YEAR	FUNDING SOURCES
2.4 (Cont.) solicit funding for, and reclaim, 20 - 25 abandoned and orphaned mine sites per year	Reclaim 3 - 6 mineral mine sites	•DMME •DCR	Annually (at current funding levels)	•Orphaned Mine Funds •319 grant
2.5 Seek release of tax generated AML funds		•Industry •DMME •DCR •DEQ	Ongoing	•N/A
2.6 Pursue the development of remining regulations and incentives to encourage the reclamation of abandoned coal mine sites	Incorporate recommendations of Ad Hoc Remining Task Force	•DMME •DCR •DEQ •NRCS •EPA •Industry Organizations	Ongoing	•N/A
	Identify sites appropriate for remining	•DMME •DCR •DEQ •NRCS •Industry Organizations	Ongoing	•N/A
2.7 The DMLR will remediate acid mine drainage sites in the Powell River watershed		•DMME	2007	•USACOE •Lenowisco PDC •OSM
2.8 Remediate AMD sites in the Powell River watershed	Continue with reclamation activities	•DMME	2007	•USACOE •Lenowisco PDC •OSM

OBJECTIVE 2 (Cont.)

Continue and enhance, where possible, the reclamation of abandoned coal mines, orphaned mineral mines, and orphaned gas and oil sites so that available resources are targeted to those sites with the greatest potential for reducing nonpoint source pollution to surface and ground water from TSS, heavy metals, and acid mine drainage (low pH), that impact the health and safety of the residents and living resources of Virginia				
2.9 Prioritize reclamation activities, when possible, to coincide with current TMDL activities	Identify sites appropriate for reclamation in support of the TMDL process	•DMME •DCR •DEQ •NRCS •Industry organi-zations	2010	•319 grant •US Dept. of the Interior •RAMP and AML Funds (if available)
2.10 Review and evaluate progress		•NPSAC agencies	Annual	•N/A

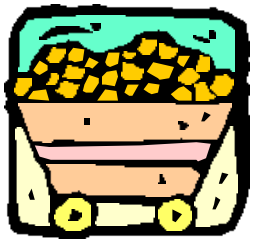
OBJECTIVE 3				
Support and develop research and education activities to improve the knowledge and understanding of Virginia residents regarding resource extraction activities and the environment				
STRATEGIES	**RELATED TASKS**	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
3.1 Conduct research, and develop and apply cost-effective land reclamation and environmental control strategies for reforestation of mined lands, remediation of acid mine drainage, mined land revegetation, watershed restoration and other subject areas as identified		•VCE Powell River Project •VPI&SU •DMME •OSM •USA-COE	Ongoing	•VCE Powell River Project •Coal industry •VPI&SU •DMME
	Expand the Powell River Project *Reclamation Guidelines* publication series for remediation of acid mine drainage and update the remaining series as needed	•VCE Powell River Project •VPI&SU	2001	•VCE Powell River Project •Coal Industry •VPI&SU •DMME
3.2 Conduct educational programs to inform appropriate clientele about land reclamation and environmental protection technologies developed through research		•VCE Powell River Project	Ongoing	•VCE Powell River Project •Coal industry •VPI&SU
	Continue conducting environmental education programs at the Powell River Project Education Center for 1,000 students who attend schools in Virginia's coal-producing region	•VCE Powell River Project	Annually	•VCE Powell River Project •Coal industry •VPI&SU
	Conduct 1 -2 curriculum development workshops for 20 - 25 teachers who bring their students to the Powell River Project Education Center	•VCE Powell River Project	Annually	•VCE Powell River Project •Coal industry •VPI&SU

OBJECTIVE 3 (Cont.)				
Support and develop research and education activities to improve the knowledge and understanding of Virginia residents regarding resource extraction activities and the environment				
STRATEGIES	**RELATED TASKS**	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
3.2 (Cont.) educational programs	Develop education materials regarding mineral extraction activities in Virginia to help meet secondary school Standards of Learning (SOLs)	•DMME Dept. of Education •Private industry	2000	•Private industry
3.3 Review and evaluate progress		•NPSAC agencies	Annually	•N/A

OBJECTIVE 4				
Identify opportunities for developing partnerships with state and federal agencies and other interested organizations to address nonpoint source pollution from abandoned mines				
STRATEGIES	**RELATED TASKS**	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
4.1 Present technology transfer seminars annually within mining communities to promote the use of BMPs		•DMME •DCR •DEQ •NRCS •VCE Powell River Project •Local gov't •Stake-holders	Annually	•N/A
4.2 Continue the work of the Remining Ad Hoc Advisory Work Group, whose members represent the coal industry, planning district commissions, state colleges and universities, state and federal agencies and a national environmental organization		•DMME •DCR •DEQ •NRCS •VCE Powell River Project •Local gov't •Stake-holders	Ongoing	•General Fund
4.3 Identify ways to increase interaction between research, education, mining and environmental communities		•DMME •DCR •DEQ •NRCS •VCE Powell River Project •Local gov't •Stake-holders	Ongoing	•Unknown

OBJECTIVE 4 (Cont.)				
Identify opportunities for developing partnerships with state and federal agencies and other interested organizations to address nonpoint source pollution from abandoned mines				
STRATEGIES	**RELATED TASKS**	**AGENCIES & OTHERS**	**TARGET YEAR**	**FUNDING SOURCES**
4.4 Identify ways to obtain increased or new funding for reclamation of abandoned mine sites		•DMME •DCR •DEQ •NRCS •VCE Powell River Project •Local gov't •Stake-holders	Ongoing	•Unknown
4.5 Review and evaluate progress		•NPSAC	Annually	•N/A

WORK GROUP MEMBERS & AGENCY/ORGANIZATION REPRESENTED



Resource Extraction

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